

CLAIMS

1. A method for processing data in a communication system, comprising:
receiving indications of signal quality associated with a plurality of user stations;
selecting a first user station and a second user station to receive data from a base station, based on the indications of signal quality;
constructing a first packet containing signaling data for the first user station and application data for the second user station;
super-imposing a second packet upon the first packet, the second packet containing application data for the first user station; and
transmitting the first and second packets simultaneously from the base station to the first and second user stations.
2. The method of claim 1 further comprising:
receiving the first and second packets at the first user station;
retrieving signaling data for the first user station from the first packet; and
extracting application data for the first user station from the second packet using the signaling data retrieved from the first packet.
3. The method of claim 2 wherein the signaling data contains information processing parameters used by the first user station to process the application data in the second packet.
4. The method of claim 3 wherein the information processing parameters include coding and modulation parameters.
5. The method of claim 1 wherein the indication of signal quality associated with each user station corresponds to a signal to noise plus interference ratio (SINR).
6. The method of claim 1 further comprising:
measuring, at each of the plurality of user stations, quality of signals received from the base station; and
communicating information representing the measured quality to the base station.

7. The method of claim 6 wherein communicating comprises:
 - determining a desired data rate supportable by the respective user station, based on the measured quality; and
 - sending a message indicating the desired data rate from the respective user station to the base station.
8. The method of claim 7 wherein the indication of signal quality associated with each user station corresponds to the desired data rate requested by the respective user station.
9. The method of claim 1 wherein a table is used to keep track of the indications of signal quality associated with the plurality of user stations.
10. The method of claim 8 wherein the first user station has a relatively higher desired data rate compared to the second user station.
11. An apparatus for processing information, comprising:
 - a receiver to receive indications of signal quality associated with a plurality of user stations;
 - a controller to select, from the plurality of user stations, a first user station and a second user station to receive data from a base station based on the indications of signal quality; and
 - a transmitter to transmit a first packet and a second packet that are superimposed together to the first and second user stations, the first packet containing signaling data for the first user station and application data for the second user station, the second packet containing application data for the first user station.
12. The apparatus of claim 11 wherein the first user station, upon receiving the first and second packets, retrieves the corresponding signaling data from the first packet and extracts application data from the second packet using the signaling data retrieved from the first packet.

13. The apparatus of claim 12 wherein the signaling data contains information processing parameters used by the first user station to process the application data in the second packet.
14. The apparatus of claim 13 wherein the information processing parameters include coding and modulation parameters.
15. The apparatus of claim 11 wherein the signal quality associated with each user station corresponds to a signal to noise plus interference ratio (SINR).
16. The apparatus of claim 11 wherein the signal quality associated with each user station is measured based on a pilot signal received from the base station.
17. The apparatus of claim 11 wherein each user station, based on the signal quality measured at the respective user station, communicates to the base station a desired data rate for data transmission from the base station to the respective user station.
18. The apparatus of claim 18 wherein a table is used to keep track of the indications of signal quality associated with the plurality of user stations.
19. The apparatus of claim 17 wherein the signal quality associated with each user station corresponds to the desired data rate for data transmission requested by the respective user station.
20. The apparatus of claim 19 wherein the first user station has a relatively higher desired data rate compared to compared to the second user station.
21. An apparatus for processing data in a communication system, comprising:
 - means for receiving indications of signal quality associated with a plurality of user stations;
 - means for selecting a first user station and a second user station to receive data from a base station based on the indications of signal quality;
 - means for constructing a first packet containing signaling data for the first user station and application data for the second user station;

means for super-imposing a second packet upon the first packet, the second packet containing application data for the first user station; and

means for transmitting the first and second packets simultaneously from the base station to the first and second user stations.

22. The apparatus of claim 21 further comprising:

means for receiving the first and second packets at the first user station;

means for retrieving signaling data for the first user station from the first packet;

and

means for extracting application data for the first user from the second packet using signaling data retrieved from the first packet.

23. The apparatus of claim 7 wherein the indication of signal quality associated with each user station is communicated to the base station as a desired data rate for data transmission from the base station to the respective user station.

24. The apparatus of claim 23 wherein a table is used to keep track of the desired data rates requested by the plurality of user stations.

25. A communication system comprising:

a base station;

a plurality of user stations to communicate with the base station via a communication link,

wherein the base station to select, among the plurality of user stations, at least two user stations including a first user station and a second user station to receive data from the base station based on data rates for data transmission supportable by each of the plurality of user stations, the base station to simultaneously transmit a first packet and a second packet that are superimposed together to the first and second user stations, the first packet containing signaling data for the first user station and application data for the second user station, the second packet containing application data for the first user station.

26. The communication system of claim 25 wherein the first user station, upon receiving the first and second packets, retrieves the corresponding signaling data from

the first packet and extracts application data from the second packet using the signaling data retrieved from the first packet.

27. The communication system of claim 25 wherein the data rates supportable by each user station corresponds to quality of signals received at each user station.

28. The communication system of claim 25 wherein the quality of signals received at each user station corresponds to a signal to noise plus interference ratio (SINR) measured at the respective user station.

29. The communication system of claim 25 wherein a table is used to keep track of the data rates associated with the plurality of user stations.

30. A machine-readable medium comprising instructions which, when executed by a machine, cause the machine to perform operations including:

- selecting, from a plurality of user stations, a first user station and a second user station to receive data from a base station based on quality of signals received at the first and second user stations;

- constructing a first packet containing signaling data for the first user station and application data for the second user station;

- super-imposing a second packet upon the first packet, the second packet containing application data for the first user station; and

- transmitting the first and second packets simultaneously from the base station to the first and second user stations.

31. The machine-readable medium of claim 30 wherein the operations performed further including:

- receiving the first and second packets at the first user station;

- retrieving signaling data for the first user station from the first packet; and

- extracting application data for the first user station from the second packet using signaling data retrieved from the first packet.

32. The machine-readable medium of claim 30 wherein the quality of signals received at each user station corresponds to a signal to noise plus interference ratio (SINR) measured at the respective user station.

33. The machine-readable medium of claim 29 wherein the quality of signals received at each user station corresponds to a data rate requested by the respective user station for data transmission from the base station to the respective user station.

34. A method for processing data, comprising:
receiving indications of signal quality associated with a plurality of user stations;
selecting, from the plurality of user stations, a set of K user stations to receive data from a base station, based at least in part on the indications of signal quality received; and
transmitting multiple packets that are superimposed together from the base station to the K user stations.

35. The method of claim 34 wherein a packet at the lowest level in the superimposed packets comprises a multi-user packet containing application information for a first user station having the lowest level signal quality in the set and control information for other user stations in the set.

36. The method of claim 35 further comprising:
receiving the superimposed packets at a second user station;
retrieving control information for the second user station from the lowest level packet in the received superimposed packets; and
extracting application information intended for the second user station from remaining packets in the received superimposed packets.

37. The method of claim 34 wherein a packet at a lower level in the superimposed packets contains control information for a packet at a next higher level in the superimposed packets.

38. The method of claim 37 wherein the packet at the lower level in the superimposed packets comprises a multi-user packet containing application data for a corresponding user and control information for another user at a next higher level.

39. The method of claim 37 wherein a packet at the highest level in the superimposed packets comprises a multi-user packet containing application data for multiple user stations in the set.

40. An apparatus for processing information, comprising:

a controller to select, from a plurality of user stations, a set of multiple user stations to receive data from a base station based at least in part on indications of signal quality associated with the plurality of user stations; and

a transmitter to transmit multiple packets superimposed together to the multiple user stations.

41. The apparatus of claim 40 wherein a packet at the lowest level in the superimposed packets comprises a multi-user packet containing application information for a first user station having the lowest level signal quality in the set and control information for other user stations in the set.

42. The apparatus of claim 40 wherein a second user station, upon receiving the superimposed packets, retrieves control information for the second user station from the lowest level packet in the received superimposed packets and extracts application information intended for the second user station from remaining packets in the received superimposed packets.

43. The apparatus of claim 40 wherein a packet at a lower level in the superimposed packets contains control information for a packet at a next higher level in the superimposed packets.

44. The apparatus of claim 43 wherein the packet at the lower level in the superimposed packets comprises a multi-user packet containing application data for a corresponding user and control information for another user at a next higher level.

45. The apparatus of claim 43 wherein a packet at the highest level in the superimposed packets comprises a multi-user packet containing application data for multiple user stations in the set.

46. A method for processing data, comprising:
receiving multiple packets that are superimposed together at a first user station, the multiple packets including a first packet and a second packet;
retrieving signaling data for the first user station from the first packet; and
extracting application data for the first user station from the second packet using the signaling data retrieved from the first packet.

47. The method of claim 46 wherein the signaling data contains information processing parameters used by the first user station to process the application data in the second packet.

48. The method of claim 47 wherein the information processing parameters include coding and modulation parameters.

49. An apparatus for processing data, comprising:
a receiver to receive multiple packets that are superimposed together, the multiple packets containing a first packet and a second packet;
a decoder to decode the multiple packets, the decoder to retrieve signaling data for a first user from the first packet and extract application data for the first user from the second packet using the signaling data retrieved from the first packet.

50. The apparatus of claim 49 wherein the signaling data contains information processing parameters used by decoder to process the application data contained in the second packet.